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MICROSCOPY.[1]

FERTILIZATION BY MEANS OF POLLEN-TUBES.—Mr. J. Kruttschnitt, of New Orleans, has been engaged for some years in the study of the pollen of flowers, the formation and history of the pollen-tube and its relation to the theory that each ovule is fertilized by a tube which descends from the stigma, reaches the ovule and enters its structure through the micropyle. His conclusion that this theory is radically erroneous, and that the functions of the pollen-tubes need re-examination, derives its force from the fact that, being an experienced, cautious and thoroughly capable observer, he has enjoyed exceptional opportunities for the study of the subject in plants most suitable for the purpose, and that the uniform result of his numerous experiments has been contradictory to the accepted theory. During the past few years he has examined thousands of cases, and has confirmed his observations in some 500 instances by mounted specimens, which show with great clearness the facts as they existed at the time of cutting the sections. Yet he has seen no pollen-tubes in contact with the ovules, nor anywhere near them, though examined during the times when fertilization must be taking place, if at all. On the contrary, the pollen-tube is always lost sight of near the stigma. The length of the style is such in many flowers that the pollen-tube would have a long way to travel to reach the ovule, and the arrangement of tissue is often such that nature would seem to have placed the greatest difficulties possible in the way of fertilization, instead of taking such a direct and certain way as would reasonably be expected. Mr. Kruttschnitt, therefore, concludes that it is next to impossible for fertilization to take place by the pollen-tube coming into actual contact with the ovules, and that, in fact, the whole ovary is impregnated with the substance of the pollen. He seems to suspect that wooden fibers or spiral ducts, leading in many cases directly toward the ovule, have been formerly mistaken for pollen-tubes. All these features are exquisitely shown in a special box of preparations just contributed to the Postal Club.

As to the general proof of the new theory, it must be admitted that the evidence is mostly negative, and that negative is at best a poor off-set for positive proof. That one man, however capable and thorough, has not seen a thing is overbalanced a thousand times by the fact that another capable and candid observer has seen it. The first may have taken the chances however small, which missed seeing that which did exist, the second could not really have seen that which did not exist. Still further observations, therefore, extending over a greater length of time, will be required to shake belief in a theory which has been so long regarded as a fact, and which rests upon the most positive and universally believed statements of fact. On the other hand it must be admitted that so capable an observer, with unlimited opportunities for favorable observation, would be extremely likely to see the pollen-tubes at or near the ovules, if they really were accustomed to reach that locality; also, that there might be danger of mistaking other structures for pollen-tubes at a distance from the stigma, that the difficulties to be encountered by the pollen-tube in reaching the ovule would be very great in many cases, and that it would be almost a miracle if all the seeds of some plants having a vast number of ovules should be fructified individually by separate grains of pollen. It should also be remembered that the statement of early observers are often handed down as facts, without verification, by subsequent writers, and that proof of such a theory as that of the fructification of the ovule directly by the pollen may seem stronger than it is, a great number of statements to that effect resting (possible) on a much more limited number of really independent statements. The early observations, too, which established the accepted theory, must have been made with lenses of inferior defining power and without the advantages of staining, which would now render error much more improbable. Furthermore pollen-tubes may in some instances have really been seen in contact with the ovules, and a general theory have been drawn from the fact, when their presence there was exceptional and not normal, or at least not general. The proof of the old theory is therefore not so positive as it seems; and the theory must be to some extent an assumption founded upon facts whose significance is not beyond dispute.

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[1] This department is edited by Dr. R. H. Ward, Troy, N. Y.

Though analogy is often an unsafe argument, the doctrine of fertilization of the whole ovary by the pollen is well illustrated, to say the least, by the ferns and others among the lower plants which produce fertile spores indefinitely as the result of a single earlier fructification. On the whole, while far more proof will be required to convince the world of the correctness of the new theory, still the very interesting and able studies of Mr. Kruttschnitts seem sufficiently conclusive to call for a reconsideration of the old theory, or at least, for a revision of the proofs upon which it rests.

AMERICAN MICROSCOPICAL SOCIETY OF THE CITY OF NEW YORK. —Owing to a misapprehension which appears to have been recently encouraged by interested parties, friends of the American Microscopical Society of the City of New York—the oldest incorporated Microscopical Society in the United States—are notified that the name of the Society *has not been changed, its meetings discontinued, or its large and valuable collection broken up and scattered.* At the recent annual election the following officers were elected for the year 1880: President, John B. Rich, M. D.; secretary, O. G. Mason, Bellevue Hospital.